EFFECT OF KAPALBHATI WITH DIFFERENT TIME DURATIONS ON SELECTED PHYSIOLOGICAL AND PSYCHOLOGICAL VARIABLES SCHOOL GIRLS

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INTRODUCTION

Yoga's Sanskrit root, "Yuj," does in fact imply "union" or "to yoke." In addition to the connection between people and the cosmic spirit of creation, which is frequently referred to as the oneness of all things, it also refers to the mental oneness, body, and spirit. The role of physical activity in enhancing general well-being and preventing lifestyle-related diseases has become increasingly understood in recent years, as has health awareness. As a result, increasing physical fitness has become more important in order to improve quality of life. Kapalbhati is a breathing technique and one of the Shatkarma (cleansing techniques) in Hatha Yoga, a traditional form of yoga that has been practiced in India for hundreds of years. Kapalbhati involves forceful exhalation through the nostrils, which is followed by passive inhalation. This breathing exercise is believed to cleanse the respiratory system, invigorate the mind, and improve overall health. Many people in Asian Indian cultures have incorporated Kapalbhati and other yoga practices into their daily routines as a way to maintain physical fitness, mental clarity, and overall well-being. Some individuals choose to incorporate yoga, including Kapalbhati, as a part of their fitness program in place of or alongside more conventional exercise routines. While yoga, particularly Kapalbhati, can have a number of positive effects on your health, always a wise move to speak with a physician first beginning any new fitness in particular if you have any pre-existing medical issues. Yoga is generally considered safe for most people, but individual needs and limitations should be taken into account to practice it safely and effectively.

KAPALBHATI

Kapalbhati very well! It's a powerful breathing exercise in yoga, aiming to bring about various health benefits through forceful exhalations and passive inhalations. The name itself suggests the potential for a radiant glow on the face of the practitioner due to its effects on the frontal region of the brain. However, as with any yoga practice, it's essential to exercise caution and seek a trained instructor's direction to guarantee safe and efficient practice, particularly if one has any pre-existing medical conditions or respiratory issues. Yoga, including Kapalbhati, can be a valuable addition to one's overall well-being when practiced mindfully and consistently.

Bhastrāvallohakārasya rechapūrau sasambhramau /
Kapālabhātirvikhyātā kaphadoshaviśoshanī //

Kapâla Bhâti, which dries up all the illnesses caused by an excess of phlegm, is performed by inhaling and exhaling rapidly like a blacksmith's bellows. (**Yogi Svatmarama).**

Importance of practicing Kapalbati

The beliefs and benefits associated with regular practice of Kapalbhati pranayama. In the context of traditional yoga philosophy, pranayama (breath control) is considered a powerful tool for purifying

the body and mind. Kapalbhati, in particular, is believed to release a significant amount of toxins from the body through forceful exhalations, leading to detoxification of various systems. The phrase "the shining forehead" refers to the literal translation of "Kapalbhati" from Sanskrit. This breathing technique is thought to bring about not only a radiant glow on the practitioner's forehead but also enhanced mental clarity and sharpness of intellect with regular practice. While these beliefs are deeply rooted in yogic tradition, it's essential to understand that the claims may not be scientifically proven or supported by empirical evidence. Yoga practices, including Kapalbhati, have a long history of subjective experiences and anecdotal evidence of various health benefits. However, in the context of modern science and evidence-based medicine, it is essential to approach such claims with a degree of skepticism. Practicing Kapalbhati and other pranayama techniques can indeed offer various benefits, including stress reduction, improved lung capacity, and increased mindfulness. However, it is essential to view these practices as complementary to a balanced lifestyle, which includes proper nutrition, regular exercise, and medical care when needed. As always, individual experiences and results may differ, thus it is advised to speak with a healthcare provider or qualified yoga instructor to understand the potential benefits and limitations of specific yoga practices, especially if you have any health concerns. Integrating yoga into your daily routine can be a positive step towards overall well-being, but it should be done mindfully and with a realistic understanding of its effects.

How to do Kapal Bhati or Skull Shining Breathing Technique

1. Sit comfortably in a cross-legged position or any other comfortable seated posture with your spine erect.
2. In an expression of openness, place your hands on your knees with the palms facing up.
3. Take a deep breath in through your nostrils.
4. As you exhale, forcefully and quickly pull your stomach inward. Contract your abdominal muscles and pull your navel towards your spine. You can place your right hand on your stomach to feel the contraction.
5. After the forceful exhalation, release the contraction in your abdomen, and the inhalation will happen automatically without any effort. Allow the breath to flow naturally into your lungs.
6. Continue this process of forceful exhalations followed by passive inhalations for 20 breaths to complete one round of Kapal Bhati.
7. After completing one round, close your eyes, and take a moment to observe the sensations in your body, allowing yourself to relax.
8. Repeat the same process for two more rounds of Kapal Bhati, with 20 breaths in each round.

It's important to remember that Kapal Bhati is a pranayama (breathing exercise) and should be practiced mindfully and with awareness. Start with a few rounds initially and gradually increase the number of rounds and breaths over time as you get comfortable with the practice.

If you are new to Kapal Bhati or have any health concerns, it's advisable to learn the technique from a qualified yoga instructor to ensure correct practice and to avoid any potential issues. As with any yoga practice, it's essential to listen to your body and avoid straining yourself during the practice.

Statement of the problem

"Effect of kapalbhati with different time durations on selected physiological and psychological variables among school girls."

Objectives of the study

- Compare the differences in results by practicing kapalbhati with repetative stroke on pulmonary functions with selected physiological and psychological variables.
- To compare the impact of various time lengths of kapalbhati on selected physiological and psychological variables.
- To analyze the role of kapalbhati with its effects on pulmonary functions in different time durations on selected physiological and psychological variables.

Delimitations

- The study will be delimited to only 60 girls of age 15 to 18 yrs.
- The follow up period will be delimited to 8 weeks only.
- The research will only test the following pulmonary functions:

PHYSIOLOGICAL VARIABLES

1. Vital capacity
2. Peak flow Rate
3. Breath holding capacity

I. Positive Breath holding capacity

II. Negative Breath holding capacity

4. Blood pressure

I. Systolic Blood Pressure

II. Diastolic Blood pressure

PSYCHOLICAL VARIABLES

- Stress
- Anxiety

LIMITATIONS

- Personal habits, mental state, emotional stress, and other things that can have an impact on the research's findings could not be controlled; this might be viewed as a study weakness. Any biasness that might exist due to in insincere response from subjects may be considered as a limitation of the study.

- The effects of uncontrollable factors like The amount of the individuals' motivation to complete the questionnaire, as well as the weather, socioeconomic standing, and emotional state at the time of the tests, were all regarded as research constraints and may have affected the study's findings.

Hypotheses

Based on evaluations, expert judgement, the scholar's personal comprehension of the issue, and research findings -

1. It is predicted that the effects of kapalbhati on pulmonary functioning would vary significantly.
2. It is predicted that kapalbhati's comparative effects and combination effects would differ significantly.
3. It is hypothesized that in each of the selected physiological variables, there will be a significant difference among the means of different training durations, irrespective of practice of kapalbhati.

Definition and explanation of terms

Kapal Bhati: Rapid performance of rechaka (exhalation) and purak (inhalation) Like (emptying and filling up of) the bellows of a blacksmith is Kapal Bhati, well known as the destroyer of disorders caused by phlegm."

The words "Kapal" and "Bhati" combine to form the compound "Kapal Bhati." "Kapal" means skull in Sanskrit, while "Bhati" means to shine. It is a continuous, powerful exhale and passive inhaling procedure. It affects the function of lungs.

Vital capacity: "Vital capacity is maximum amount of air that can be expelled after reaching maximal inspiration."

- Medical Dictionary © 2012 Farlex and Partner

Peak flow Rate: The maximal flow rate produced during a vigorous exhale, beginning with complete lung inflate, is known as the peak flow rate (PFR). Peak flow rate, which is influenced by the patient's

willpower and physical strength, largely indicates significant airway flow.

The effort-dependent component of the expiratory manoeuvre is when airflow is at its maximum, therefore low numbers might be the result of a less-than-maximum effort rather than an airway blockage. Nevertheless, patients with asthma and other pulmonary disorders frequently use peak flow rate measurement to track the severity of airway blockage since it is simple to do so using a low-cost, tiny portable instrument.

Breathe holding capacity: It is the amount of time that a person can hold their breath without breathing in or out. Breath holding could be positive and negative; it is referred to as positive hence when breath is hold after forceful inhalation of the air. Similar to this, holding your breath after a powerful exhalation is referred to be negative.

We will discuss using breathing exercises to naturally lower blood pressure in the sections of the article that follow.

Blood Pressure: the pressure in the blood that the blood on the inner blood vessel interiors varies throughout the body depending on the heart's phase of contraction, one's state of health, their level of activity, etc.

Systolic Blood Pressure: It is particularly the highest arterial pressure measured throughout the heart's left ventricle's contraction.

Diastolic Blood pressure: The diastolic pressure is particularly minimal arterial pressure experienced as the muscles loosen and enlarge, the heart's ventricles during blood filling**.**

Stress : Stress is a condition of being under pressure, either physically or emotionally. It might be triggered by any situation or notion that makes you angry, frustrated, or anxious. Stress is your body's reaction to a challenge or demand. When it helps you avoid danger or meet a deadline, for example, stress may occasionally be helpful.

Anxiety: strong need or desire for something to happen or to be done.

Significance of the Study

- To know the effect of Kapalbhati on pulmonary functions.
- To make aware of the transient of education and knowledge of yoga to the considerable extent.
- To educate the sedentary population on the importance of Kapalbhati for the healthful living.
- The study may help significantly to those who are involved in research in the area of yoga.
- The result of the study may help in incorporating Kapalbhati in regular fitness program.

REVIEWS OF LITERATURE

The "Review of Related Literature" section is an indispensable component of this research paper, providing a comprehensive understanding of the chosen topic. Through a meticulous search process, the research scholar has gathered relevant materials from various sources, including books, journals, periodicals, magazines, newspapers, and unpublished theses. This literature review serves as a knowledge repository, offering background information and presenting a critical analysis of previous research on the subject. By identifying weaknesses, conflicts, and limitations in existing studies, the section ensures a robust foundation for the current research. Moreover, the inclusion of related studies conducted before contributes to the originality of this work, demonstrating how it builds upon and adds value to the existing body of knowledge. By properly citing the sources, the research scholar acknowledges the efforts of other researchers and provides an avenue for readers to delve deeper into the referenced works. Notably, this review also helps to identify gaps in the literature, highlighting areas that warrant further investigation. Overall, the thoroughness and dedication displayed in compiling and presenting the related literature reinforce the credibility and significance of this research endeavor.

- **Dinesh T. and Gaur G.S. (2013**)

  The research project carried out by the Physiology Department, JIPMER, focused on examining the effects of In young, healthy

individuals, peak expiratory flow rate after practising the Kapal Bhati breathing technique. Pranayama refers to a set of breathing techniques that have profound effects on various physiological functions, including those related to the lungs, heart, and higher cognitive processes.The research was carried out on a group of 60 healthy volunteers, comprising both genders. The pranayama group (n=30) or the control group (n=30) were randomly chosen for these individuals. The pranayama group performed Kapal Bhati pranayama under the supervision of a licenced yoga instructor. Training sessions began with 30 repetitions for 1 minute and were eventually raised to 5 minutes, twice daily, three times each week.over the course of 6 weeks.To assess the impact of the pranayama training, the researchers measured the participants' Peak Expiratory Flow Rate (PEFR) using a Peak Flow Metre (Pulmo Peak) before and after the 6-week training period showed a significant difference in peak expiratory flow rate when compared to the baseline values. The analysis showed indicated a statistically significant improvement in was observed after 6 weeks of Kapal Bhati pranayama instruction. the measured pulmonary function parameters.

Panwar Sheetal and Chourishi Ashutosh (2012)

The research conducted on 75 medical students aimed to examine the impact of yoga's pranayama on young, healthy people's pulmonary function tests individuals. Previous studies have already explored the role of pranayama in improving pulmonary functions in both diseased and healthy subjects. The primary This study's goal was to evaluate the impact of pranayama on various pulmonary function parameters in a group of medical students, consisting of 50 males and 25 females,

aged between 18 to 25 years.All participants received 15 days of training from a certified and They were then given permission to do pranayama for 30 minutes each day for three months by a certified yoga teacher. Spirometry, a common test used to measure lung function, was conducted before and after the three-month period of pranayama practice. The results were then analyzed using the 'paired t-test', a statistical test that compares the means of two related groups.

The study's findings showed important improvements in multiple pulmonary function parameters after three months of pranayama practice. These improvements included increased Tidal volume, vital capacity (VC), peak expiratory flow rate (PEFR), maximal voluntary ventilation (MVV), forced expiratory volume in the first second (FEV1), forced vital capacity (FVC), and forced mid expiratory flow in 0.25 to 0.75 seconds (FEF25-75). Amounts of p associated with these improvements were highly significant, indicating a clear positive physiological impact of pranayama on the respiratory system (pSingh Savita and Soni Ritu (2012) examined effects of yoga practise on asthmatic patients' pulmonary function tests, notably their TLCO (transfer factor of lung for carbon monoxide) values.

Balaji P.A. and Varne Smitha R. (2012)

The research article titled Transcendental meditation and yogic practises' physiological effects on health and disease " published in Pub Med Central explores the impact of yoga as a way of life and specific practices, including yoga asanas (postures), pranayamas (breathing practices), and meditation, on both physical and mental well-being. Yoga, originating from ancient Indian traditions, encompasses changes in mental attitude, diet, and various techniques

aimed at achieving higher consciousness. There have been recent events that a noticeable increase in research related to yoga, but the number of reviews focusing on Transcendental meditation and yoga (TM) in relation to health and disease remains limited. To address this gap, the researchers conducted a Medline lookup to gather related content in the English literature that evaluated the effects of yoga and TM on the body. Upon reviewing the collected data, the researchers discovered significant health benefits associated with yoga and TM practices. Some of the observed benefits include improved cognitive function, better respiration, reduced cardiovascular risk, lowered body mass index (BMI), improved blood pressure, and potential positive effects on diabetes management. Additionally, the study found that yoga also had a positive impact on the immune system and showed potential for alleviating joint disorders. Overall, this research highlights the potential physiological benefits of practicing yoga and transcendental meditation. The findings suggest that adopting these ancient practices as part of one's lifestyle may contribute to overall health and well-being, offering benefits for both physical and mental aspects. However, it is essential to note that while this review provides valuable insights, further research and studies are needed to comprehensively understand the effects of yogic practices and TM in various health conditions and across diverse populations

- **Upadhyay Dhungel K. and Malhotra V. (2008)**

  The study examined the effects of Cardiorespiratory effects of alternate nostril breathing (ANB), a sort of pranayama or breathing exercise, on healthy young people. Pranayama is a yogic technique known to elicit various physiological responses in individuals. In this

research, the specific pranayama technique investigated was Nadisudhi Pranayama, also known as Alternate Nostril Breathing.The research participants were healthy young adults who performed the ANB Cardiorespiratory effects of alternate nostril breathing (ANB), a sort of pranayama or breathing exercise, on healthy young people, consistently, four weeks. Before and after the four-week training period, the researchers recorded various cardiorespiratory parameters to assess the effects of the practice. The study's conclusions showed several significant changes in cardiorespiratory functions after the four weeks of ANB practice. Specifically, there was a noticeable increase in Pulse Pressure (PP) and Peak Expiratory Flow Rate (PEFR)). Additionally, the subjects experienced a drop in diastolic blood pressure (DBP), respiratory rate (RR), and pulse rate (PR), although the decrease was not statistically significant in systolic blood pressure (SBP)..Based on the results, the researchers concluded that regular practice of ANB (Nadisudhi) leads to an increase in parasympathetic activity. The "rest and digest" response in the body is connected to the parasympathetic nervous system., promoting relaxation and a sense of calm. Therefore, the study suggests that ANB practice can positively influence the autonomic nervous system, leading to greater parasympathetic activation, which may contribute to the observed changes in the cardiorespiratory parameters. This research increases the volume of research demonstrating the possible health advantages of pranayama techniques like Alternate Nostril Breathing. The study highlights the importance of incorporating such yogic practices into daily routines for improving cardiorespiratory functions and overall well-being, especially in healthy individuals. However, as with any

research, further investigations with larger and diverse populations are necessary to corroborate these findings and to explore the applicability of ANB in specific health conditions and age groups

- **Gupta Shilpa S. and Sawane Manish V. (2012)**

  The researchers designed a comparative study involving 100 healthy young volunteers who wereDivided into two groups at random, one group trained for 12 weeks in yogic activities, and the other group trained in swimming.Small cohorts of 10 participants each were used for the training and data collection.. Before and after the training period, the researchers assessed the participants' anthropometric parameters and pulmonary function parameters, including Peak Expiratory Flow Rate (PEFR), Forced Vital Capacity (FVC), Forced Expiratory Flow between 25-75% of FVC (FEF25-75%), Forced Expiratory Volume in the First Second (FEV1) Forced Expiratory Flow from 0.2 to 1.2 liters (FEF 0.2-1.2 l), and Maximum Voluntary Ventilation (MVV).The results showed that both yoga and swimming led to statistically significant improvements in all the assessed pulmonary function parameters. However, when comparing the improvements between the two groups, the statistical analysis using unpaired t-test or Mann Whitney U test revealed that swimming had a statistically better impact on FVC, FEF25-75%, and MVV when compared to yogic exercises. Despite the slight edge favoring swimming as a preferred exercise modality for respiratory health, the study acknowledged that both yoga and swimming can be advocated as exercise prescriptions due to their significant improvement in pulmonary functions. However, the researchers emphasized the

importance of considering other factors, such as the trainees' ability to maintain continued motivation and interest in their chosen exercise regime, when making exercise recommendation .The findings provide valuable insights for individuals and healthcare professionals when considering exercise choices for improving respiratory health. Ultimately, the decision between yoga and swimming as preferred exercises should consider individual preferences, interests, and adherence potential, alongside the physiological benefits observed in this study.

Research Methodology

This chapter covers topic selection, variable selection, evaluation standards, and test administration, data collecting, measurement techniques, and statistical methods used in the study**.**

Selection of subjects

The investigation's goal is to know the effect of Kapal Bhati with respect to a few physiological and psychological parameters among school girls. To achieve these purpose 60 girls subjects between the age group of 15-18 years were randomly selected and assigned to control group and experimental group of 15 each for a period of 8 week.

Selection of Variables

The following factors will be chosen for the study based on the literature that is currently accessible, the results of related research projects, and the specific goal of the study:

1. Vital capacity
2. Peak flow Rate

3. Breath holding capacity

I. Positive Breath holding capacity

II. Negative Breath holding capacity

4. Blood pressure

I. Systolic Blood Pressure

II. Diastolic Blood pressure

PSYCHOLICAL VARIABLES

- Stress
    - Anxiety

Criterion Measures

CRITERION MEASURES			
Sl. No	**Variables**	**Equipment**	**Unit**
1	Vital capacity	Dry-spirometer	Litres
2	Peak flow Rate	Peak flow meter	Litres/Minute
3	Breath holding capacity **I.** Positive Breath holding capacity **II.** Negative Breath holding capacity	Manually, stop watch	Minutes/Seconds
4	Blood pressure **I.** Systolic Blood Pressure	Omegon Gigit Arm BP monitor	Mmhg

	II. Diastolic Blood pressure		
5	Stress	Perceived Stress Questionnaire (PSQ)	Score
6	Anxiety	State-Trait Anxiety Inventory (STAI from Y-1 and Y-2)	Score

Administration of Test

The test for data collection will be administered individually by the research scholar to all the subjects. All subjects will provide the data (pre, during and post) separately, under the guidance of scholar. The subjects were urged to be honest and genuine data and the research scholar will reassure the respondents that the data they provide will be kept private and used solely for the purposes of the research.

Collection of Data

The data will be gathered from each of the four groups were tested beforehand (pre-training), following the four weeks of training,

and from the control group. of Kapalbhati (during-test) and after the 8 weeks(post-test) training of Kapalbhati.

TRAINING SCHEDULE

Overview of Training Schedule

	Group 1	Group 2	Group 3	Group 4
Total Time duration	30-40 minutes	30-40 minutes	30-40 minutes	Control Group
Time duration for 1 round	1 minutes	2 minutes	4 minutes	Control Group
Training Variation	Kapalbhati (1 round for 1 minute)	Kapalbhati (1 round for 2 minute)	Kapalbhati (1 round for 4 minute)	Control Group
Total Rounds	16	8	4	Control Group
Rounds***-Rest****	1 **– 0.5 –** 1	1 **– 1 –** 1	1 – **2 –** 1	Control Group
Starting Prayer	1 minutes	1 minutes	1 minutes	Control Group
General	2 minutes	2 minutes	2 minutes	Control Group

Stretching				
Relaxation Posture & Closing Prayer	5 minutes	5 minutes	5 minutes	Control Group
Strokes of Kapalbhati per minute	80-90	80-90	80-90	Control Group

***Round in numbers** ****Rest in minutes**

EXPERIMENTAL DESIGN

Between-within-group design or mixed-model design will be use for this research. In the experimental treatment will be randomly assigned to three experimental groups. The data will be collected from all the four groups prior to training (pretest), and four weeks later (during-test) and after 8 weeks(post-test)' training of Kapalbhati.

STATISTICAL TECHNIQUES

The analysis part will be divided into two parts: Descriptive and Comparative parts respectively.

To contrast the results of various kapalbhati timing and training duration on selected physiological and psychological variables 4 x 3 Mixed (Between-Within) factorial ANCOVA will be used as the statistical technique and the level of significance will be set at 0.05.

In addition Statistically descriptive terms like mean and standard deviation will also calculate. For analysis, SPSS-20 software was employed..

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